REMARKS

This paper is responsive to a non-final Office action dated November 7, 2003. Claims 1-29 were examined. Claims 16 and 26 are objected to. Claims 1-9 stand rejected under 35 U.S.C. § 101. Claims 10-13, 15, 16, 18-24, and 26 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,512,787 to Tung et al. Claims 14, 25, and 27 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Tung. Claim 17 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Tung in view of U.S. Patent N. 5,864,545 to Gonikberg et al. Claims 28 and 29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Tung in view of U.S. Patent No. 5,852,630 to Langberg et al.

Notice of References Cited (PTO-892)

Applicant respectfully requests the Examiner to enter U.S Patent No. 5,852,630 to Langberg et al., cited in the Office Action, on a PTO form 892 and send a copy of the PTO form 892 to Applicant.

Claim Objections

Claim 16 has been amended to recite "at least two instances." Claim 26 has been amended to depend from claim 1. No new matter has been added.

Rejections under 35 U.S.C. § 101

Claims 1-9 stand rejected under 35 U.S.C. § 101 as not being statutory subject matter. Applicants respectfully traverse. Claims 1-9 are directed to an impairment compensation sequence. Applicant respectfully maintains that an impairment compensation sequence, whether embodied as a signal or in stored form, is an article of manufacture, which is statutory subject matter. In each case, the claimed invention has practical application and produces a useful concrete and tangible result. MPEP § 2106 IV.B.2.(a). See for example, MPEP § 2106 IV.B.1.(c) which states that

> [c]laims that recite nothing but the physical characteristics of a form of energy, such as a frequency, voltage, or the strength of a magnetic field, define energy or magnetism, *per se*, and as such are nonstatutory natural phenomena. *O'Reilly v. Morse*, 56 U.S. (15 How.) 62, 112-14 (1853). However, a signal claim directed to

> a practical application of electromagnetic energy is statutory regardless of its transitory nature. See *O'Reilly*, 56 U.S. at 114,-19; *In re Breslow*, 616 F.2d 516, 519-21, 205 USPQ 221, 225-26 (CCPA 1980)

(emphasis added). The impairment compensation sequence of claims 1-9 are directed to a practical application of use in a communications system. Claims 1-9 are directed to a manufacture which has a practical application in the technological arts and thus are statutory subject matter. Accordingly, Applicant respectfully requests that the rejection of claims 1-9 be withdrawn.

Art Rejections under 35 U.S.C. § 102

Claims 10-13, 15, 16, 18-24, and 26 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,512,787 to Tung et al.

Regarding claim 10, Applicant respectfully maintains that Tung, alone or in combination with other references of record, fails to teach or suggest

> a receiver to receive an impairment compensation sequence, the impairment compensation sequence including: N phases, wherein N is selected such that each potential impairment, if present, is periodic therein; and a sequence of symbols, the sequence organized to place at least one instance of each symbol from a predetermined set of symbols in each phase to allow detection of the potential impairments in each of the N phases,

as recited in claim 10. Tung teaches at col. 4, lines 16-23, that the

> digital impairment learning (DIL) process uses a probing sequence including multiple subsequences. Each subsequence repeats transmission of a code selected for the subsequence, where the sign of the selected code alternates in a pseudo-random fashion. The pseudo-random sequence has a period that is greater than the order of feedback terms used in an equalizer and prime relative to the robbed bit signaling (RBS) period (typically 6 or 12 codes).

The probing sequence of Tung is received by receiver 200 and used by the receiver to determine the set of mappers for a channel. (FIG. 2, col. 4, lines 47-50; col. 5, lines 9-29) The mappers of Tung are defined by variables measured from a received probing sequence. (Col. 5, lines 18-29) The mappers of Tung are not part of an impairment compensation sequence received by a receiver, as required by claim 10. Nowhere does Tung teach or suggest an impairment compensation sequence of symbols, the sequence organized to place at least one instance of each symbol from a predetermined set of symbols in each phase to allow detection of the potential impairments in each of the N phases, as required by claim 10. For these reasons, Applicant respectfully submits that claim 10 distinguishes over Tung and all references of record. Accordingly, Applicant respectfully requests that the rejection of claim 10 and all claims dependent thereon, be withdrawn.

Regarding claim 18, Applicant respectfully maintains that Tung, alone or in combination with other references of record, fails to teach or suggest

> receiving a sequence of symbols, the sequence organized to place at least one instance of each symbol from a predetermined set of symbols in each of N phases, wherein N is selected such that each potential impairment, if present, is periodic therein

as recited by claim 18. Tung teaches at col. 4, lines 16-23, that the

> digital impairment learning (DIL) process uses a probing sequence including multiple subsequences. Each subsequence repeats transmission of a code selected for the subsequence, where the sign of the selected code alternates in a pseudo-random fashion. The pseudo-random sequence has a period that is greater than the order of feedback terms used in an equalizer and prime relative to the robbed bit signaling (RBS) period (typically 6 or 12 codes).

The probing sequence of Tung is received by receiver 200 and used by the receiver to determine the set of mappers for a channel. (FIG. 2, col. 4, lines 47-50; col. 5, lines 9-29) The mappers of Tung are defined by variables measured from a received probing sequence. (Col. 5, lines 18-29) The mappers of Tung are not part of an impairment compensation sequence received by a receiver, as required by claim 18. Nowhere does Tung teach or suggest receiving a sequence of

symbols, the sequence organized to place at least one instance of each symbol from a predetermined set of symbols in each of N phases, wherein N is selected such that each potential impairment, if present, is periodic therein, as required by claim 18. For these reasons, Applicant respectfully submits that claim 18 distinguishes over Tung and all references of record. Accordingly, Applicant respectfully requests that the rejection of claim 18 and all claims dependent thereon, be withdrawn.

Art Rejections under 35 U.S.C. § 103

Claims 14, 25, and 27 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Tung. Claim 17 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Tung in view of Gonikberg. Claims 28 and 29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Tung in view of Langberg.

Claims 14, 25, and 27 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Tung. Claims 14, 25, and 27 are believed to be dependent from allowable base claims and are allowable for at least this reason. Accordingly, Applicant respectfully requests that the rejections of claims 14, 25, and 27 be withdrawn.

Claim 17 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Tung in view of Gonikberg. Applicant respectfully maintains that Tung, alone or in combination with Gonikberg, or other references of record, fails to teach or suggest

> a demodulator for demodulating a modulated impairment compensation sequence, the impairment compensation sequence including a sequence of amplitudes transmitted from terminal equipment, the sequence organized to place at least one instance of each symbol from a predetermined set of symbols in each phase to allow detection of the potential impairments in each of the N phases,

as recited in claim 17. Tung teaches at col. 4, lines 16-23, that the

> digital impairment learning (DIL) process uses a probing sequence including multiple subsequences. Each subsequence repeats transmission of a code selected for the subsequence, where the sign of the selected code alternates in a pseudo-random fashion. The pseudo-random sequence has a period that is greater than the order of feedback terms used in an equalizer and prime relative to the robbed bit signaling (RBS) period (typically 6 or 12 codes).

The probing sequence of Tung is received by receiver 200 and used by the receiver to determine the set of mappers for a channel. (FIG. 2, col. 4, lines 47-50; col. 5, lines 9-29) The mappers of Tung are defined by variables measured from a received probing sequence. (Col. 5, lines 18-29) The mappers of Tung are not part of an impairment compensation sequence transmitted from terminal equipment, as required by claim 17. Nowhere does Tung teach or suggest a sequence of amplitudes transmitted from terminal equipment, the sequence organized to place at least one instance of each symbol from a predetermined set of symbols in each phase to allow detection of the potential impairments in each of the N phases, as required by claim 17.

Gonikberg fails to compensate for the shortcomings of Tung. Gonikberg teaches a phase-splitting T/3 equalizer and echo canceller structure. (Abstract) Modem training of Gonikberg includes transmitting a reference training sequence, such as exemplary training sequences taught by ITU-T Recommendation V.34, "A Modem Operating at Data Signalling Rates of up to 28,800 bit/s for Use on the General Switched Telephone Network and on Leased Point-to-Point 2-Wire Telephone-Type Circuits," dated September, 1994. Gonikberg fails to teach or suggest that the training sequence includes amplitudes transmitted from terminal equipment, the sequence organized to place at least one instance of each symbol from a predetermined set of symbols in each phase to allow detection of the potential impairments in each of the N phases, as required by claim 17. Thus, Tung, alone or in combination with Gonikberg, or other references of record, fails to teach or suggest the limitations of claim 17.

For these reasons, Applicant respectfully maintains that claim 17 distinguishes over Tung and all references of record. Accordingly, Applicant respectfully requests that the rejection of claim 17 and all claims dependent thereon, be withdrawn.

Claims 28 and 29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Tung in view of Langberg. Regarding claim 28, Applicant respectfully maintains that Tung, alone or in combination with Langberg, or other references of record, fails to teach or suggest

> a sequence of amplitudes transmitted from terminal equipment, the sequence organized to place at least one instance of each symbol from a predetermined set of symbols in each phase to allow detection of the potential impairments in each of the N phases,

as recited in claim 28. Tung teaches at col. 4, lines 16-23, that the

> digital impairment learning (DIL) process uses a probing sequence including multiple subsequences. Each subsequence repeats transmission of a code selected for the subsequence, where the sign of the selected code alternates in a pseudo-random fashion. The pseudo-random sequence has a period that is greater than the order of feedback terms used in an equalizer and prime relative to the robbed bit signaling (RBS) period (typically 6 or 12 codes).

The probing sequence of Tung is received by receiver 200 and used by the receiver to determine the set of mappers for a channel. (FIG. 2, col. 4, lines 47-50; col. 5, lines 9-29) The mappers of Tung are defined by variables measured from a received probing sequence. (Col. 5, lines 18-29) The mappers of Tung are not part of an impairment compensation sequence transmitted from terminal equipment, as required by claim 17. Nowhere does Tung teach or suggest a sequence of amplitudes transmitted from terminal equipment, the sequence organized to place at least one instance of each symbol from a predetermined set of symbols in each phase to allow detection of the potential impairments in each of the N phases, as required by claim 28.

Langberg fails to compensate for the shortcomings of Tung. Langberg teaches establishing a communications connection using last known parameters. (Col. 2, lines 9-14) Langberg teaches sending a sequence of symbols selected from a known constellation (col. 5, lines 14-16), but nowhere teaches or suggests a sequence of amplitudes transmitted from terminal equipment, the sequence organized to place at least one instance of each symbol from a predetermined set of symbols in each phase to allow detection of the potential impairments in each of the N phases, as required by claim 28. Thus, Tung, alone or in combination with Langberg, or other references of record, fails to teach or suggest the limitations of claim 28.

For these reasons, Applicant respectfully maintains that claim 28 distinguishes over Tung and all references of record. Accordingly, Applicant respectfully requests that the rejection of claim 28 and all claims dependent thereon, be withdrawn.

In summary, claims 1-30 are in the case. Claims 16 and 26 have been amended. Claim 30 has been added. All claims are believed to be allowable over the art of record, and a Notice of Allowance to that effect is respectfully solicited. Nonetheless, if any issues remain that could be more efficiently handled by telephone, the Examiner is requested to call the undersigned at the number listed below.

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Respectfully submitted,

Nicole Teitler Cave, Reg. No. 54,021
Attorney for Applicant(s)
(512) 338-6315
(512) 338-6301 (fax)